WO 03/103877 PCT/BE03/00097

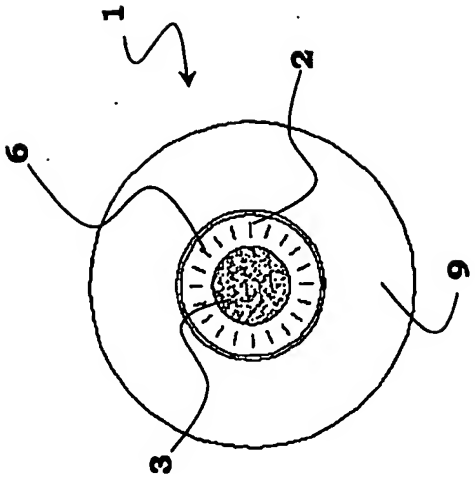

Fig. 2

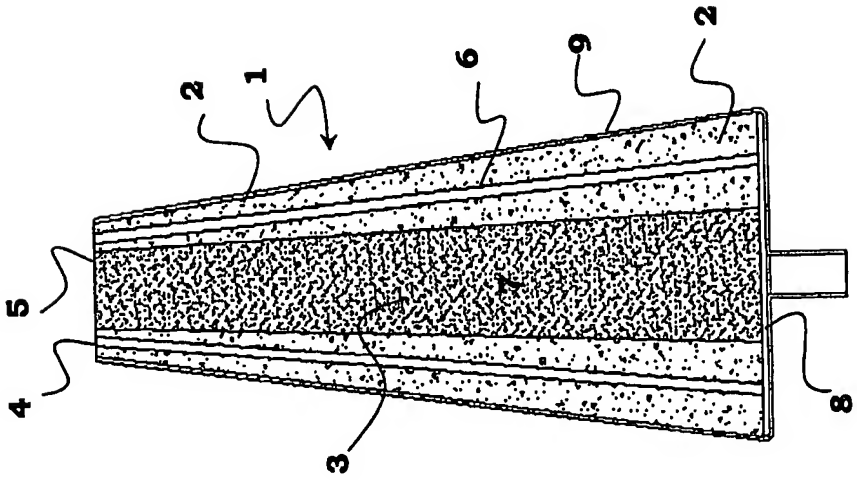

Fig. 1

some extent. When the second body has worn back to below the level of the surface of the first body. This results in turn to a surface layer of the first body above the remaining surface of the second body becoming weaker and breaking away easier. Eventually, the blocked surface of the first body having broken away, the fluid passages of the first body are cleared and can now open easily. It is believed that this results from the fact that a fluid permeable refractory material is more prone to wear.

[0019] Numerous arrangements of the first and second bodies in the injection device can be considered. For example, the second body can be formed as an annular porous ring surrounding a first body comprising slots formed in a fluid-impermeable material. However, the above discussed advantage is particularly noticeable when the second body is fittingly inserted in the first body, preferably in the middle of the first body so that the wear pattern of the molten metal contacting surface of the injection device is more even across this surface. In an advantageous embodiment of the invention, the fluid passages in the first body are aligned radially from the centre point of the second body so that all the fluid passages of the first body will be affected equally by the surface wear resulting from the fluid streaming from the second body. Nevertheless, for constructional and economical reasons, it can be advantageous to maximize the dimension of the second body. Therefore, the invention also relates to an injection device wherein the fluid passages in the first body are arranged substantially parallel to the interface between the first and second bodies so that the second body can occupy more space. The second body can have a round or polygonal section.

[0020] In a preferred variant of the invention, the first body is made of a refractory material less permeable to the fluid than the material of the second body, for example of a castable material, and the fluid passages extending therethrough are constituted of slots or bores, preferably of controlled direction and opening sizes.

[0021] In another of its aspects, the invention relates to a process for the reliable injection of a fluid into a metallurgical vessel comprising the steps of

a) feeding an injection device with the fluid to introduce into the metallurgical vessel;

b) injecting the said fluid through a initiating section of the injection device having higher fluid flow resistance than the remainder of the injection device (the initiating section being able to open more easily than the remaining sections of the injection device);

c) using the fluid flow streaming from the said initiating section for cleaning and opening fluid passages in an injection section of the injection device having less fluid flow resistance than the initiating section;

d) injecting the fluid into the metallurgical vessel through the injection section while the initiating section substantially ceases to allow fluid passage.

[0022] The invention will now be better described with reference to the enclosed drawings which are only provided for the purpose of illustrating the invention and not to limit its scope. Fig. 1 shows schematically an injection device according to the invention and Fig. 2 is a top view of the injection device shown at Fig. 1. ~~Fig. 3 is a top view of a variant of the injection device.~~

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[0023] In these figures, the injection device (1) is inserted into the lining of a metallurgical vessel (not shown) with its molten metal contacting surfaces (4, 5) at least level with the surface of the lining. The injection device is comprised of at least first and second bodies (2, 3) which are fittingly assembled. Most often the injection device is enveloped in a metal can (9). The first body (2) comprises fluid passages (6) – constituted by slots - extending from fluid supply means (8) to its molten metal contacting surface (4). The second body (3) comprises fluid passages (7) – constituted by the porosity of the material - extending from its molten metal contacting surface (5) to fluid supply means (8). In the embodiment of figure 2, the fluid passages 6 extend radially from a centre point of the second body. ~~In the embodiment of figure 3, the fluid passages 6 are arranged substantially parallel to the interface between the first and second bodies (2,3).~~ In the embodiment depicted on Figs. 1 ~~to 3~~ and 2, the fluid supply means (8) are constituted by a plenum chamber which is connected to a fluid feeding pipe (not shown).

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It has been observed that a fluid pressure of 6 to 9 bars is sufficient to open the fluid passages of the injection device according to the invention.